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(54) Title: PEPTIDE OLIGOMERS FOR USE AS HIV VACCINES

(57) Abstract: Partially occluded and/ or multimeric presentations of peptides mimic the epitopes recognised by antibodies capable of neutralising diverse clinical isolates of the human immunodeficiency virus type 1 (HIV-1). By "partially occluded" is meant a presentation that has a three-dimensional structure (probably a barrel/cylindrical/ helical shape) generated by inter-chain disulphide bridging or other means that has internally, at or near its base, the epitope that is recognised by the neutralising antibody; i.e. a partially occluded presentation is a three-dimensional presentation of one or more neutralising epitopes such that the epitope is located in a pocket or cleft. Such presentations are better at eliciting antibodies that have the neutralising phenotype, and may be used as vaccines or to produce antibodies for the prevention or treatment of HIV-1 infection.

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INTERNATIONAL SEARCH REPORT

Inter ☐ Application No
PCT/GB 03/05436

A. CLASSIFICATION OF SUBJECT MATTER IPC 7 C07K14/16 C07K16/10 A61K39/395		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) IPC 7 C07K A61K		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal, CHEM ABS Data, WPI Data, BIOSIS		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 185 147 A (PAPSIDERO) 9 February 1993 (1993-02-09) column 10	1-19, 23-28
X	US 5 750 332 A (F A ROBEY ET AL.) 12 May 1998 (1998-05-12) the whole document	1-19, 23-28
X	WO 94/03487 A (J. F. ZAGURY) 17 February 1994 (1994-02-17) page 25	1-19, 23-28
P,X	WO 03/022879 A (POLYMUN SCIENTIFIC IMMUNBIOLOGISCHE FORSCHUNG GMBH) 20 March 2003 (2003-03-20) cited in the application the whole document	1-19, 23-28
-/-		
<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C. <input checked="" type="checkbox"/> Patent family members are listed in annex.		
* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "Y" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "&" document member of the same patent family		
Date of the actual completion of the international search 8 December 2004		Date of mailing of the international search report 30/12/2004
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax (+31-70) 340-3016		Authorized officer Masturzo, P

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Inte 1al Application No
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JOURNAL OF IMMUNOLOGY., vol. 148, no. 12, 15 June 1992 (1992-06-15), pages 4012-4020, XP002309573 USTHE WILLIAMS AND WILKINS CO. BALTIMORE. the whole document	1-19, 23-28
X	JOURNAL OF IMMUNOLOGY., vol. 162, no. 10, 15 May 1999 (1999-05-15), pages 6155-6161, XP002309574 USTHE WILLIAMS AND WILKINS CO. BALTIMORE. the whole document	1-19, 23-28
X	JOURNAL OF VIROLOGY., vol. 75, no. 12, June 2001 (2001-06), pages 5526-5540, XP002309575 USTHE AMERICAN SOCIETY FOR MICROBIOLOGY. the whole document	1-19, 23-28
X	PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF USA., vol. 89, May 1992 (1992-05), pages 3879-3883, XP002309576 USNATIONAL ACADEMY OF SCIENCE. WASHINGTON. the whole document	1-19, 23-28
A	JOURNAL OF VIROLOGY., vol. 75, no. 14, July 2001 (2001-07), pages 6692-6699, XP002309577 USTHE AMERICAN SOCIETY FOR MICROBIOLOGY. cited in the application the whole document	1-19, 23-28
T	BIOCONJUGATE CHEMISTRY., vol. 15, 2004, pages 112-120, XP002309578 USAMERICAN CHEMICAL SOCIETY, WASHINGTON. page 112	1-19, 23-28
X	WO 94/29339 A (CONNAUGHT LABORATORIES) 22 December 1994 (1994-12-22) the whole document	1-19, 23-28

INTERNATIONAL SEARCH REPORT

ational application No.
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Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.: 20-22, 25(partially), 29
because they relate to subject matter not required to be searched by this Authority, namely:
Although claim 25 is directed to a method of treatment of the human/animal body, the search has been carried out and based on the alleged effects of the compound/composition.
2. ☒ Claims Nos.: 20-22, 25, 29
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
see FURTHER INFORMATION sheet PCT/ISA/210
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box I.1

Although claim 25 is directed to a method of treatment of the human/animal body, the search has been carried out and based on the alleged effects of the compound/composition.

Continuation of Box I.2

Claims Nos.: 20-22, 25, 29

Present claims 20-22, 25 (partially) and 29 relate to products and method based thereon defined by reference to a desirable characteristic or property, namely to be an antibody identified by its binding to a given antigen. The claims cover all products and methods having this characteristic or property, whereas the application provides support within the meaning of Article 6 PCT and/or disclosure within the meaning of Article 5 PCT for only a very limited number of such products and methods/apparatus. In the present case, the claims so lack support, and the application so lacks disclosure, that a meaningful search over the whole of the claimed scope is impossible. Independent of the above reasoning, the claims also lack clarity (Article 6 PCT). An attempt is made to define the product/compound/method/apparatus by reference to a result to be achieved. Again, this lack of clarity in the present case is such as to render a meaningful search over the whole of the claimed scope impossible. Consequently, the search has been carried out for those parts of the claims which appear to be clear, supported and disclosed, namely those parts relating to the methods as indicated in claim 25 and dependent on claims 1-12. Claims 20-22 and 29 have not been searched at all.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.5), should the problems which led to the Article 17(2) declaration be overcome.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/JP 03/05436

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5185147	A	09-02-1993	NONE	
US 5750332	A	12-05-1998	AT 177843 T AU 695450 B2 AU 1684495 A CA 2181590 A1 DE 69508382 D1 EP 0740792 A1 WO 9520162 A1	15-04-1999 13-08-1998 08-08-1995 27-07-1995 22-04-1999 06-11-1996 27-07-1995
WO 9403487	A	17-02-1994	FR 2694560 A1 FR 2694938 A1 AT 202114 T AU 4712993 A DE 69330348 D1 EP 0656010 A1 WO 9403487 A1	11-02-1994 25-02-1994 15-06-2001 03-03-1994 19-07-2001 07-06-1995 17-02-1994
WO 03022879	A	20-03-2003	WO 03022879 A2 EP 1423417 A2 US 2004241641 A1	20-03-2003 02-06-2004 02-12-2004
WO 9429339	A	22-12-1994	AU 693098 B2 AU 6967394 A BR 9406821 A CA 2164818 A1 WO 9429339 A1 CN 1128538 A ,B EP 0702693 A1 JP 8511007 T RU 2201421 C2 US 5639854 A US 5759769 A US 5876731 A US 5795955 A US 5817754 A US 5800822 A US 5951986 A	25-06-1998 03-01-1995 26-03-1996 22-12-1994 22-12-1994 07-08-1996 27-03-1996 19-11-1996 27-03-2003 17-06-1997 02-06-1998 02-03-1999 18-08-1998 06-10-1998 01-09-1998 14-09-1999